

Supplemental Table 1: International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM) codes used to identify sickle cell disease (SCD) complications

Code	Category	Description
415.11*	PE	Iatrogenic pulmonary embolism and infarction
415.13*	PE	Saddle embolus of pulmonary artery
415.19*	PE	Other pulmonary embolism and infarction
673.2*	PE	Obstetrical blood clot embolism
451.11	DVT	Thrombophlebitis of deep vessels of lower extremities, femoral vein
451.19	DVT	Thrombophlebitis of deep vessel of lower extremities, other
451.81	DVT	Thrombophlebitis of other sites, iliac vein
453.2	DVT	Venous thrombosis of inferior vena cava
453.40	DVT	Acute venous thrombosis of unspecified deep vessels of lower extremity
453.41*	DVT	Acute venous thrombosis of deep vessels of proximal lower extremity
453.42*	DVT	Acute venous thrombosis of deep vessels of distal lower extremity
453.8	DVT	Acute venous thrombosis of other specified veins (eliminated Oct 1, 2009)
453.89	DVT	Acute venous thrombosis of other specified veins
453.9	DVT	Acute venous thrombosis of unspecified site
671.31*	DVT	DVT antepartum-Delivered
671.33*	DVT	DVT-antepartum
671.42*	DVT	DVT postpartum-Delivered
671.44*	DVT	DVT-postpartum

*Codes were searched in all secondary positions (1-24)

Code	Category	Description
451.83	UE	Phlebitis deep veins upper extremity (began 1993)
451.89	UE	Thrombophlebitis, NEC
453.82	UE	Acute DVT/embolism of upper extremity (began 2009)
453.83	UE	Acute DVT/embolism of upper extremity, NOS (began 2009)
453.84	UE	Acute DVT/embolism of axillary vein (began 2009)
453.85	UE	Acute DVT/embolism of subclavian vein (began 2009)
453.86	UE	Acute DVT/embolism of internal jugular vein (began 2009)
453.87	UE	Acute DVT/embolism of thoracic vein, NEC (began 2009)

PE- Pulmonary Embolism

DVT- Lower extremity deep vein thrombosis

UE- Upper extremity deep vein thrombosis

NEC- Not elsewhere classified

NOS- Not otherwise specified

Code	Category	Description
517.3	ACS	Acute chest syndrome (began 2003)
480.xx	Pneumonia	Viral pneumonia
481.xx	Pneumonia	Pneumococcal pneumonia

482.xx **Pneumonia** Other bacterial pneumonia
483.xx **Pneumonia** Pneumonia due to other specified organism
484.xx **Pneumonia** Pneumonia in infectious diseases classified elsewhere
485.xx **Pneumonia** Bronchopneumonia, organism unspecified
486.xx **Pneumonia** Pneumonia, organism unspecified

733.4 **ONFH** Aseptic necrosis of bone, site unspecified
733.42 **ONFH** Aseptic necrosis of bone, head and neck of femur
733.43 **ONFH** Aseptic necrosis of bone, medial femoral condyle
733.49 **ONFH** Aseptic necrosis of bone, other

434.01 **Stroke** Occlusion of cerebral arteries, cerebral thrombosis with infarction
434.11 **Stroke** Occlusion of cerebral arteries, cerebral embolism with infarction
434.91 **Stroke** Occlusion of cerebral arteries, unspecified with infarction

x – any 4th or 5th digit

Supplemental Table 2: International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM) codes used to identify bleeding

Code	Category	Description
430	ICH	Non-traumatic subarachnoid hemorrhage
431	ICH	Non-traumatic intracerebral hemorrhage
432.0	ICH	Non-traumatic extradural hemorrhage
432.1	ICH	Subdural hemorrhage
432.9	ICH	Intracranial hemorrhage, NOS
456.0	GI	Esophageal varices w/bleed
456.20	GI	Esophageal varices in other disease, w/bleed
530.7	GI	Mallory-Weiss syndrome
530.82	GI	Esophageal hemorrhage (Begin 1993)
531.00	GI	Acute gastric ulcer w/hemorrhage, w/out obstruction
531.01	GI	Acute gastric ulcer w/hemorrhage, w/obstruction
531.20	GI	Acute gastric ulcer w/hemorrhage, w/perforation
531.21	GI	Acute gastric ulcer w/hemorrhage, w/perforation and obstruction
531.40	GI	Chronic gastric ulcer w/hemorrhage, w/out obstruction
531.41	GI	Chronic gastric ulcer w/hemorrhage, w/obstruction
531.60	GI	Chronic gastric ulcer w/hemorrhage, w/perforation
531.61	GI	Chronic gastric ulcer w/hemorrhage, w/perforation and obstruction
532.00	GI	Acute duodenal ulcer w/hemorrhage, w/out obstruction
532.01	GI	Acute duodenal ulcer w/hemorrhage, w/obstruction
532.20	GI	Acute duodenal ulcer w/hemorrhage, w/perforation
532.21	GI	Acute duodenal ulcer w/hemorrhage, w/perforation and obstruction
532.40	GI	Chronic duodenal ulcer w/hemorrhage, w/out obstruction
532.41	GI	Chronic duodenal ulcer w/hemorrhage, w/obstruction
532.60	GI	Chronic duodenal ulcer w/hemorrhage, w/perforation
532.61	GI	Chronic duodenal ulcer w/hemorrhage, w/perforation and obstruction
533.00	GI	Acute peptic ulcer w/hemorrhage, w/out obstruction
533.01	GI	Acute peptic ulcer w/hemorrhage, w/obstruction
533.20	GI	Acute peptic ulcer w/hemorrhage, w/perforation
533.21	GI	Acute peptic ulcer w/hemorrhage, w/perforation and obstruction
533.40	GI	Chronic peptic ulcer w/hemorrhage, w/out obstruction
533.41	GI	Chronic peptic ulcer w/hemorrhage, w/obstruction
533.60	GI	Chronic peptic ulcer w/hemorrhage, w/perforation
533.61	GI	Chronic peptic ulcer w/hemorrhage, w/perforation and obstruction
534.00	GI	Acute gastrojejunal ulcer w/hemorrhage, w/out obstruction
534.01	GI	Acute gastrojejunal ulcer w/hemorrhage, w/obstruction
534.20	GI	Acute gastrojejunal ulcer w/hemorrhage, w/perforation
534.21	GI	Acute gastrojejunal ulcer w/hemorrhage, w/perforation and obstruction
534.40	GI	Chronic gastrojejunal ulcer w/hemorrhage, w/out obstruction

534.41	GI	Chronic gastrojejunal ulcer w/hemorrhage, w/obstruction
534.60	GI	Chronic gastrojejunal ulcer w/hemorrhage, w/perforation
534.61	GI	Chronic gastrojejunal ulcer w/hemorrhage, w/perforation and obstruction
535.01	GI	Acute gastritis w/hemorrhage
535.11	GI	Atrophic Gastritis w/hemorrhage
535.21	GI	Gastric mucosal hypertrophy w/hemorrhage
535.31	GI	Alcoholic gastritis w/hemorrhage
535.41	GI	Other specified gastritis w/hemorrhage
535.51	GI	Unspecified gastritis and gastroduodenitis w/hemorrhage
535.61	GI	Duodenitis w/hemorrhage
537.83	GI	Angiodysplasia of stomach and duodenum w/hemorrhage
562.02	GI	Diverticulosis of small intestine w/hemorrhage
562.03	GI	Diverticulitis of small intestine w/hemorrhage
562.12	GI	Diverticulosis of colon w/hemorrhage
562.13	GI	Diverticulitis of colon w/hemorrhage
568.81	GI	Hemoperitoneum
569.3	GI	Rectal & anal hemorrhage
569.85	GI	Angiodysplasia of intestine w/hemorrhage
578.0	GI	Hematemesis
578.1	GI	Melena
578.9	GI	Gastrointestinal hemorrhage, NOS
626.6	Menorrhagia	Excessive menstruation
787.7	Epistaxis	Epistaxis
360.43	Hemophthalmos	Hemophthalmos
379.23	Hemophthalmos	Vitreous hemorrhage
362.81	Hemophthalmos	Retinal hemorrhage
599.71	Gross Hematuria	Gross hematuria
423.0	Other bleed	Hemopericardium
459.0	Other bleed	Hemorrhage, NOS
593.81	Other bleed	Renal vascular disorder
784.8	Other bleed	Hemorrhage from throat
786.30	Other bleed	Hemoptysis, unspecified
786.31	Other bleed	Acute idiopathic pulmonary hemorrhage in infants
786.39	Other bleed	Other hemoptysis
719.10	Other bleed	Hemarthrosis, site unspecified
719.11	Other bleed	Hemarthrosis, shoulder region
719.12	Other bleed	Hemarthrosis, upper arm
719.13	Other bleed	Hemarthrosis, forearm
719.14	Other bleed	Hemarthrosis, hand
719.15	Other bleed	Hemarthrosis, pelvic region and thigh
719.16	Other bleed	Hemarthrosis, lower leg
719.17	Other bleed	Hemarthrosis, ankle and foot

719.18	Other bleed	Hemarthrosis, other specified sites
719.19	Other bleed	Hemarthrosis, multiple sites

ICH-

Intracranial

hemorrhage

GI- Gastrointestinal hemorrhage

NOS- Not otherwise specified

Supplemental Table 3: Frequency and location of subsequent bleeding events among sickle cell disease patients in California, 1991-2014

Location of First Bleed	Subsequent Bleeding Types														
	N	ICH		GI		Menorrhagia		Epistaxis		Ocular		Gross Hematuria		Other	
N	N	%	N	row %	N	row %	N	row %	N	row %	N	row %	N	row %	
ICH	137	12	8.8%	18	13.1%	4	2.9%	11	8.0%	0	0.0%	1	0.7%	1	0.7%
GI	559	15	2.7%	179	32.0%	25	4.5%	46	8.2%	4	0.7%	4	0.7%	22	3.9%
Menorrhagia	203	3	1.5%	0	0.0%	71	35.0%	12	5.9%	2	1.0%	2	1.0%	4	2.0%
Epistaxis	257	6	2.3%	0	0.0%	37	14.4%	45	17.5%	3	1.2%	6	2.3%	10	3.9%
Ocular	69	3	4.3%	0	0.0%	11	15.9%	2	2.9%	22	31.9%	0	0.0%	0	0.0%
Gross Hematuria	35	1	2.9%	0	0.0%	2	5.7%	2	5.7%	1	2.9%	4	11.4%	0	0.0%
Other	85	1	1.2%	0	0.0%	10	11.8%	3	3.5%	7	8.2%	1	1.2%	11	12.9%

A subsequent bleeding event of the same bleeding type same as index event had to be ≥ 7 days after the discharge date of index bleed

ICH- Intracranial hemorrhage

GI- Gastrointestinal